

(12) AUSTRALIAN PATENT ABSTRACT
(19) AU

(11) AU-A-37257/85

(54) PREFABRICATED BUILDING ELEMENT
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(21) 37257/85 (22) 2.1.85 (24) 2.1.85
(43) 10.7.86
(51)⁴ E04C 2/34 E04C 2/36 E04C 2/46
(74) SF
(57) Claim

1) A prefabricated building element (10) which is constructed as a mould having walls (1, 2) which are intended to constitute portions of an outside and an inside, respectively, of a finished wall of a building, characterized in that said mould walls (1, 2) are secured to and held together by profile beams (3; 3a) which interconnect said mould walls and simultaneously constitute metal reinforcement and contribute to the taking up of the pressure of the moulding material against said mould walls (1, 2).

FORM 10

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)
FOR OFFICE USE:

Class Int. Class

37257/85

Complete Specification Lodged:

Accepted:

Published:

Priority:

Related Art:

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Complete Specification for the invention entitled:

"A PREFABRICATED BUILDING ELEMENT"

The following statement is a full description of this invention,
including the best method of performing it known to me.

Abstract of the Disclosure

10. A prefabricated building element (10) is constructed as a mould having walls (1, 2) which are intended to constitute portions of an outside and an inside, respectively, of a finished wall of a building. To provide a light but yet strong and rigid construction in which the mould walls (1, 2) are capable of taking up great loads, said mould walls are secured to and held together by profile beams (3) which interconnect said mould walls and simultaneously constitute metal reinforcement and contribute to the taking up of the pressure of the moulding material against said mould walls.

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~~A prefabricated Building Element~~

This invention relates to a prefabricated building element which is constructed as a mould having walls which are intended to constitute portions of an outside and an inside, respectively, of a finished wall of a building.

Said buildings are in many cases multi-storage buildings. When erecting multi-storage buildings nowadays this is carried out by mould pouring of supporting or load-bearing pillars or columns and beam elements. Between the columns a brick wall or the like is subsequently built up. Another method resides in utilizing load-bearing elements of concrete which in this case form a complete outer wall.

The drawback of the above building methods resides among other things in the time expenditure at the pouring or moulding of the columns, when among other things moulding or pouring wood has to be composed or erected and subsequently be pulled down. Building or facing elements of concrete restrict transportation and handling capabilities on account of their weight.

The principal object of the invention is to eliminate this drawback and to reduce the building costs.

This object is attained thanks to the fact that the mould walls are secured to and held together by profile beams which interconnect said mould walls and simultaneously constitute metal reinforcement and contribute to the taking up of the pressure of the moulding material against said mould walls.

Further features and advantages of the invention will become apparent from the following detailed description and the annexed drawings which diagrammatically and as non-limiting examples illustrate some preferred embodiments of the invention.

Fig. 1 is a perspective side view of a building element which is intended for outer walls and is provided with a window opening.

Fig. 2 is a simplified cross-sectional view of the upper portion of a lower wall element, a naked or framed floor or deck poured or moulded together therewith, and an upper wall element poured thereupon.

Fig. 3 is a simplified cross-sectional view illustrating the pouring or moulding together of a wall element with a bottom plate.

Fig. 4 is a perspective inside view of a second embodiment of a building element which is intended for outer walls and is provided with a door opening.

Fig. 5 is a perspective outside view of the wall element according to Fig. 4.

Fig. 6 is a perspective view of a wall element which is intended for inner walls.

Fig. 7 is a perspective inside view of a modified building element according to the invention.

Fig. 8 is a perspective outside view of the building element according to Fig. 7.

Fig. 9 is a perspective inside view of a modified embodiment of the building element according to Figs. 7 and 8.

Fig. 10 is a perspective outside view of the building element according to Fig. 9.

Similar or corresponding parts are designated with the same reference numerals possibly with the addition of a letter suffix, throughout.

The building system according to the invention comprises a plurality of building or wall elements which are generally designated 10 and comprise an outer or facing board or panel 1 and an inner or wall lining board or panel 2 as well as spacing beams 3 which interconnect the boards 1 and 2 to which they are secured.

10 The building elements 10 preferably have the same height as a story or floor and can be provided with a window opening which is designated with 11 in Fig. 1 and may be omitted or replaced by a door opening. In the embodiment according to Fig. 1 the beams 3 are U-beams which are each provided with a series of circular openings 8, preferably with a uniform spacing. These openings permit the insertion of reinforcing irons 7 which are located centrally, substantially midway between the boards 1 and 2 and may extend through several adjacent building elements 10 and interconnect them.

20 In the space between the boards 1 and 2 electrical conductors and tubing for water, ventilation and sanitary equipment are installed.

The building elements 10 as described above constitute moulds into which concrete or the like is to be poured for forming a building block. The building elements are easy to transport thanks to their small weight, which is advantageous, e.g. in export.

30 When a building is to be erected, a concrete plate or naked floor 4 (Fig. 3) is moulded or poured on the selected site, anchoring or reinforcing irons 5 being preferably partly embedded in the concrete at the moulding. The wall elements 10 are transported to the building site and placed upon the concrete plate 4 with the boards 1 and 2 straddling the anchoring irons 5 as indicated in Fig. 3. To facilitate the placing of the wall elements at the proper place on the bottom plate or naked floor 4 fixation means 12 diagrammatically indicated in Fig. 3 are used.

It is an important feature of the invention that one of the marginal U-beams 3 projects beyond the corresponding lateral end portions of the boards 1 and 2 of the wall element 10 for forming a tongue, whereas the other marginal U-beam is located completely inside of the corresponding marginal portions of the boards 1 and 2 at the opposite end of the wall element 10 for forming a groove 18 intended for cooperation with the tongue forming beam 3 of an adjacent wall element 10, as is clearly shown in Fig. 1. Said two marginal U-beams are turned in mutually opposite directions as is also apparent from Fig. 1.

In the space between the outer facing board 1 and the inner wall lining board 2 of the building element or mould 1 concrete or another material, preferably having similar load carrying properties as concrete, is injected or poured. In this connection it is to be noted that one important feature of this embodiment of the invention resides therein, that the outer facing board 1 of the building element 10, which is intended for outer walls, is taller than the inner wall lining board 2, as is also apparent from Fig. 1. Thus, when concrete has been poured into the space between the boards 1 and 2 right to the top of the inner board 2, a shelf is formed by the surface of the concrete and the top portion of the outer board 1.

When all building elements of a storey or floor have been erected and filled with concrete or the like (Fig. 2), load carrying elements 15 which form the bottom of a framed or naked floor generally designated 6 are installed with their ends resting upon said shelves of the elements 10. After that a naked floor of concrete or the like 14 is poured upon said load carrying elements 15 and said shelves, the upper end of the outer boards 1 serving as mould walls. The naked floor 14 is preferably reinforced by reinforcing irons 13, as is shown in Fig. 2.

When the naked floor 6 has been poured or moulded, next floor or storey is erected thereupon, and so on. To strengthen and stabilize the construction two adjacent

building elements 10 located just below and above each other, respectively, and belonging to different storeys are preferably interconnected with each other as well as with the intermediate naked floor 6 by means of poured-in anchoring or reinforcing irons 16.

Figs. 4 and 5 illustrate a second embodiment of the building block 10 according to the invention. This building block is also intended for outer walls. In Figs. 4 and 5 a door opening 11 has been substituted for the corresponding window opening 11 in Fig. 1. Secondly, an insulation layer 19, preferably of foamed or expanded plastic or possibly of mineral wool or the like has been provided on the inside of the outer panel 1. Finally, the U-beams 3 have been replaced by composite wire beams generally designated 3a and comprising two U-rails 31 and 32 and a zigzag-shaped steel wire 33 having every second apex welded to a flange of one, 31 or 32, of the U-rails and the remaining apexes welded to the corresponding flange of the other U-rail 32 or 31, respectively.

A modified building block substantially corresponding to that according to Figs. 4 and 5 but intended for inner walls is illustrated in Fig. 6. This building block requires no insulation and has neither a door, nor a window opening.

The building blocks 10 according to Figs. 4, 5 and/or 6, 7 may be reinforced by reinforcing irons introduced between the zigzag-shaped wire 33 and the rails 31, 32, said reinforcing irons (not shown) being located at the corners between predetermined ones of the lower ends of the wire elements 33 and the adjacent rail 31, 32, resting upon said ends and preferably being welded or tied to the wire element 33 and/or the rail 31, 32. In this case substantially every second reinforcing iron is located adjacent one of the mould walls 1, 2, the remainder of the reinforcing irons being located adjacent the opposite mould wall.

In the embodiment according to Figs. 7 and 8 the shelf previously referred to which is now designated 21 at the top of the inner wall 2 is formed by supplemental boards or panels 22, 23 which form a mould for concrete or the like. The space between the outer wall 1 on the one hand and the inner wall 2 and the supplemental boards 22, 23 on the other hand is substantially filled with thermal and/or sound absorbing insulation 24 and a sparse, reinforcing network of ribs 25 which hold together the walls 1 and 2.

10 An insulating film 27 of plastic or the like is provided adjacent the inner wall 2 for preventing moisture from penetrating the finished wall. Between the outer wall 1 and the panel 23 there are provided iron bands 28 which are to be moulded in into a reinforced naked floor of concrete which is supported by said shelf 21. The bands 28 secure the naked floor and the wall elements to each other.

20 The building element according to Figs. 9 and 10 differs from that just described substantially only through the addition of a mould 40 for a column which at its top is in open communication with said shelf 21 and extends in the entire height of said inner wall 2. As is evident from particularly Fig. 9 this mould 40 projects inwardly from the inner wall 2 and is provided with reinforcing irons 41. The naked, reinforced floor on top of the shelf 21 and the column are moulded or poured in a single operation.

30 Thanks to the invention there has been provided a building having finished or ready-made wall lining boards without any formwork and its entailed drawbacks. Through the invention also the problems in connection with heavy transports and formwork have been eliminated. The economical advantages are evident.

The embodiments described above and illustrated in the drawings are, of course, to be regarded merely as non-limiting examples and may as to their details be modified in several respects within the scope of the following claims. Thus, profile beams having e.g. a Z-shaped cross section may be substituted for the U-beams 3 or the composite wire beams 3a. Furthermore, new embodiments which are also within the scope of the invention may be created by combining details taken from different ones of the exemplificatory embodiments described above.

C L A I M S

The claims defining the invention are as follows:-

- 1) A prefabricated building element (10) which is constructed as a mould having walls (1, 2) which are intended to constitute portions of an outside and an inside, respectively, of a finished wall of a building, characterized in that said mould walls (1, 2) are secured to and held together by profile beams (3; 3a) which interconnect said mould walls and simultaneously constitute metal reinforcement and contribute to the taking up of the pressure of the moulding material against said mould walls (1, 2).
- 2) A prefabricated building element according to claim 1, characterized in that said profile beams (3; 3a) are substantially vertical in the position of utilization of the building element (10).
- 3) A prefabricated building element according to claim 1 or 2, characterized in that said profile beams (3; 3a) are provided with openings for reinforcing irons (7) extending cross-wise with respect to said profile beams.
- 4) A prefabricated building element according to any of the preceding claims, characterized in that each of said profile beams (3) has a web portion and two longitudinally extending flanges which are interconnected through said web portion, each flange engaging and being secured to an individual mould wall.
- 5) A prefabricated building element according to claim 4, characterized in that said beams are U-beams (3).
- 6) A prefabricated building element according to claim 4, characterized in that said beams are Z-beams.
- 7) A prefabricated building element according to claim 4, characterized in that said beams are metal wire beams (3a).

- 8) A prefabricated building element according to claims 3 and 4, c h a r a c t e r i z e d in that said reinforcing irons are centrally located, substantially midway between said mould walls (1, 2).
- 9) A prefabricated building element according to claims 3 and 7, c h a r a c t e r i z e d in that substantially every second reinforcing iron is located adjacent one of the mould walls (1, 2), the remainder of the reinforcing irons being located adjacent the opposite mould wall.
- 10) A prefabricated building element according to claim 4, 5, 6 or 7, c h a r a c t e r i z e d in that two profile beams are each arranged at an individual one of the vertical end edges of the building element (10) in such a manner that the longitudinal flanges of one of said beams substantially in their entire extension partially project beyond the corresponding lateral end edge of the appurtenant mould wall (1, 2) for forming a tongue, and in that the flanges of the other lateral end beam in their entirety are located inside of the corresponding end edge of the appurtenant mould wall for forming a groove or the like, which is adapted to cooperate with the tongue of an adjacent building element.
- 11) A prefabricated building element according to any of the preceding claims, c h a r a c t e r i z e d in that one (1) of said mould walls is higher than the other mould wall (2).
- 12) A prefabricated building element according to any of the preceding claims, c h a r a c t e r i z e d in that one (1) of said mould walls is insulated on its inside.
- 13) A prefabricated building element according to claim 9, c h a r a c t e r i z e d in that the gap between said outer wall (1) and said inner wall (2) is substantially closed at the top of the inner wall for forming a shelf (21) which together with said outer wall forms said mould, the space between said walls being substantially filled with a thermal and/or sound absorbing insulation (24) which together with a sparse framework of ribs (25) replaces said profile beams.

14) A prefabricated building element according to claim 11, characterized by the provision of a mould (40) for a column which at its top is in open communication with said shelf (21) and extends in the entire height of said inner wall (2), said column forming mould partly projecting inwardly from said inner wall in its entire extension.

15) A prefabricated building element according to claim 12, characterized by the provision of reinforcing irons (41) in said column forming mould (40).

16) A prefabricated building element substantially as described above and shown in any of Figs. 1 and 4-10 on the accompanying drawings.

DATED this TWENTY-EIGHTH DAY OF DECEMBER 1974

GERT EVALD JORANSSON

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SPRISON & PEDERSEN

FIG.2

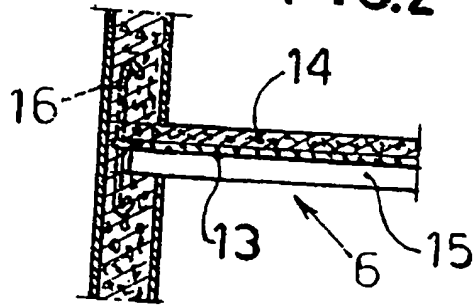


FIG.1

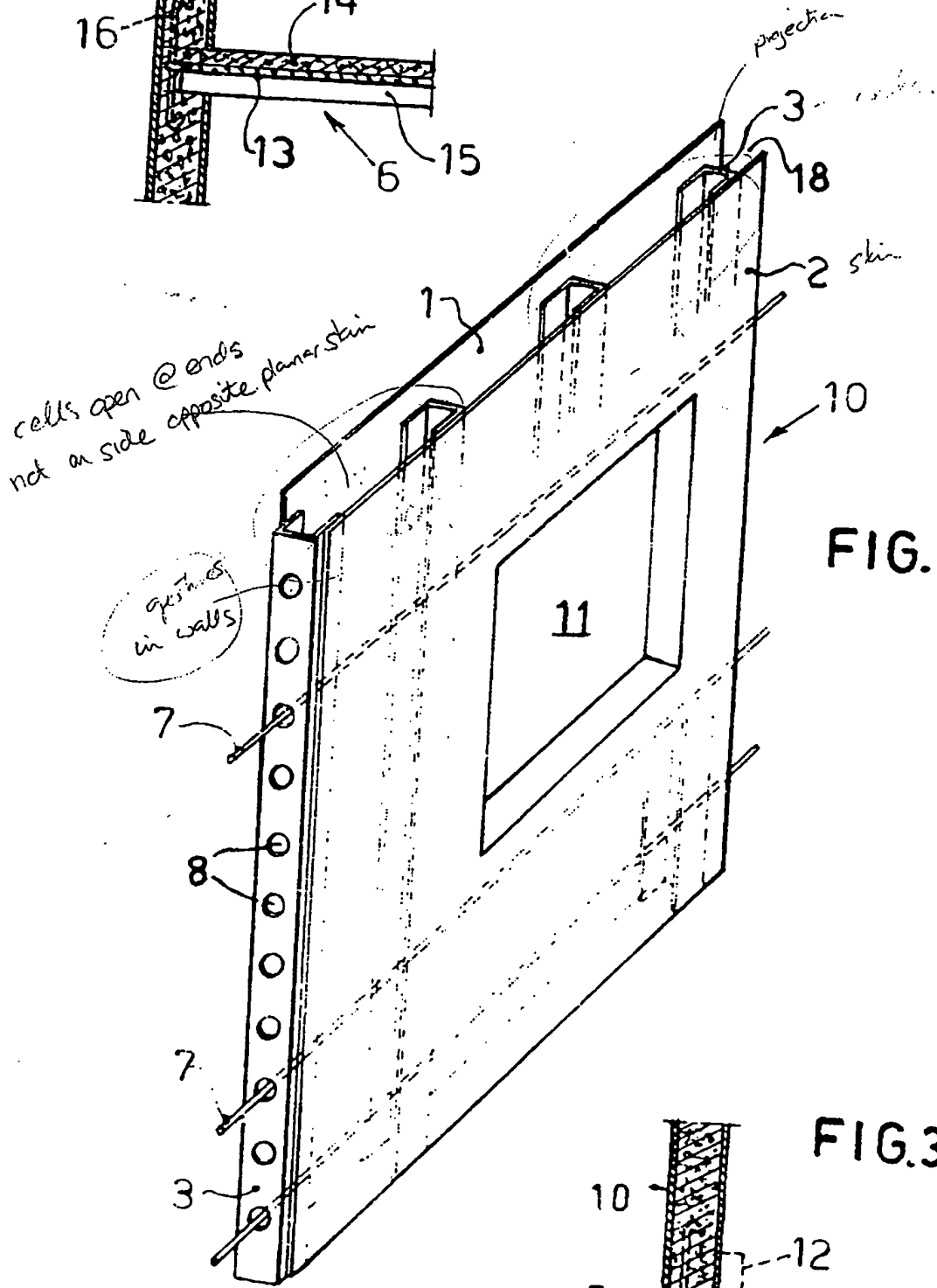


FIG.3

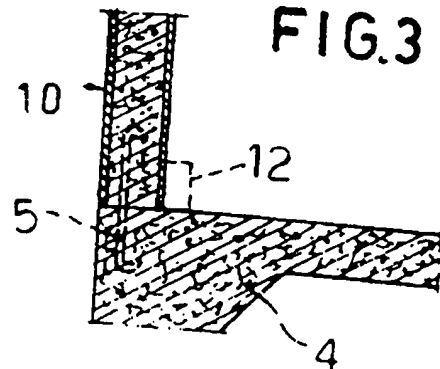
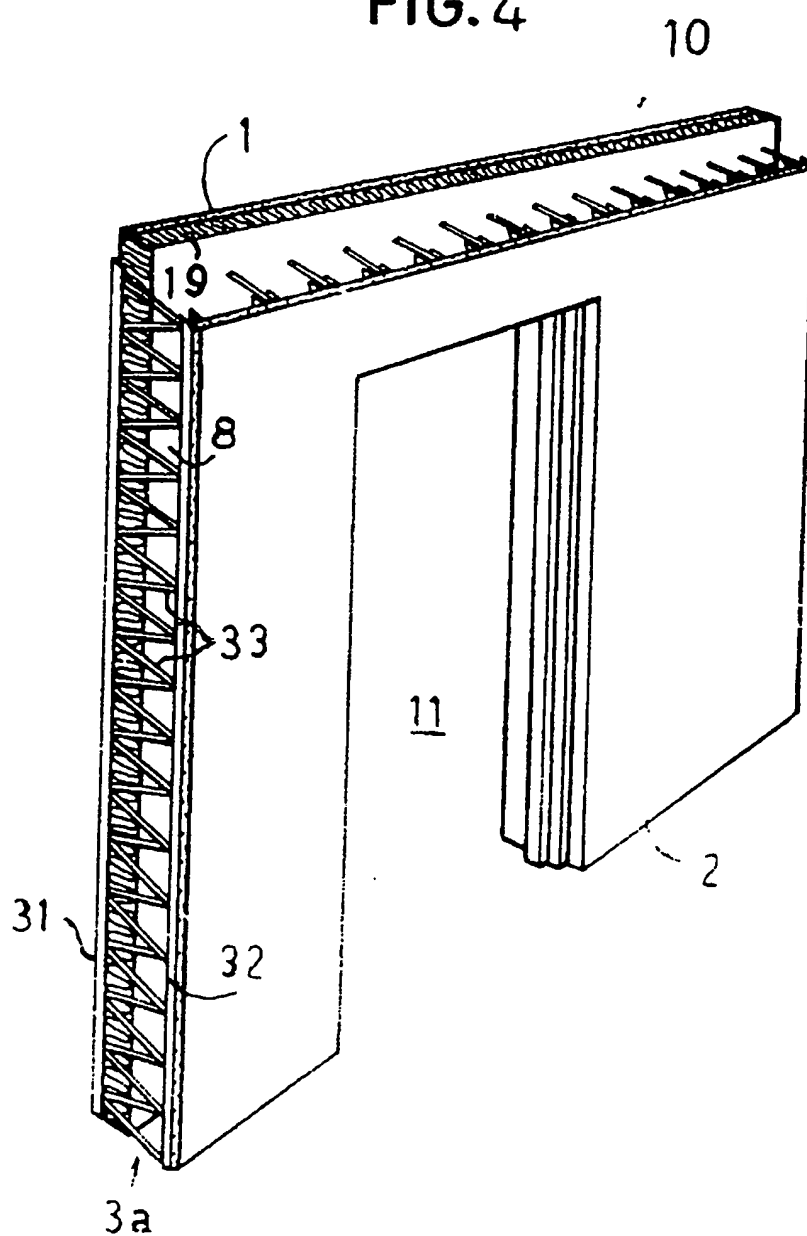


FIG. 4



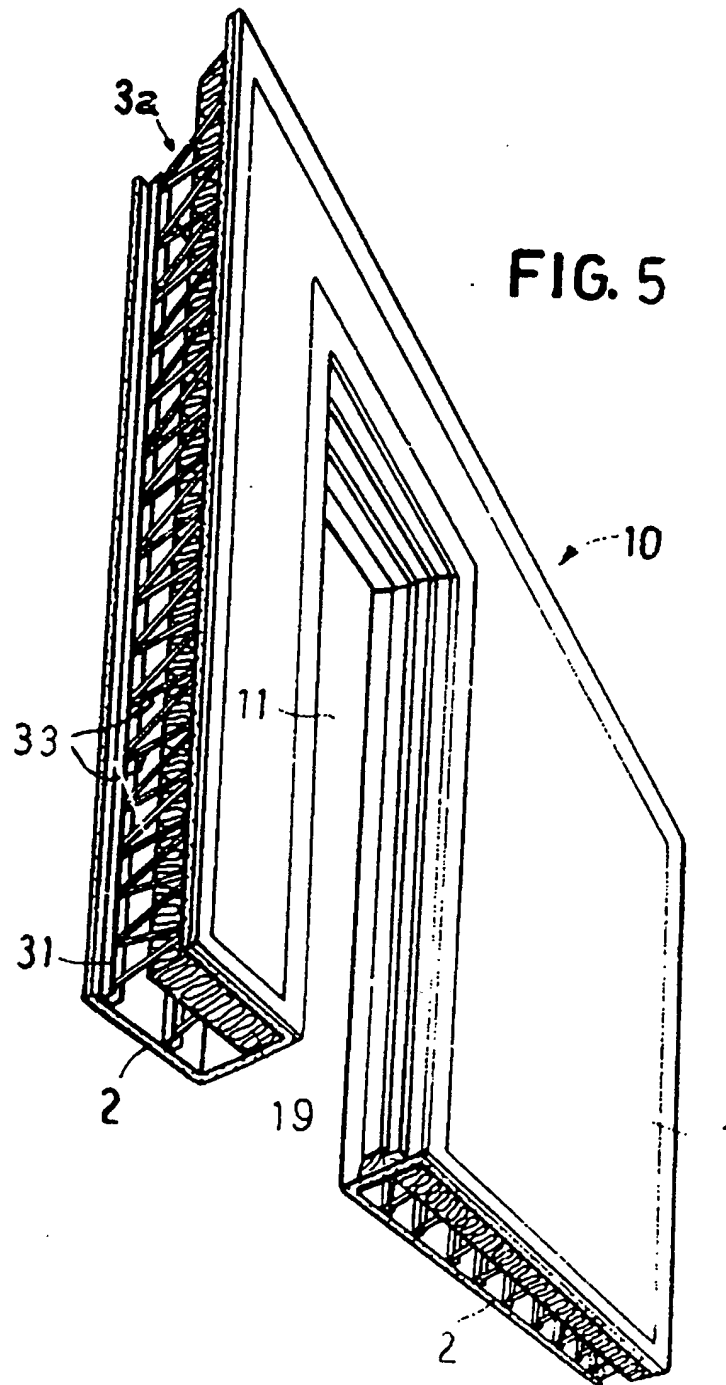


FIG. 6

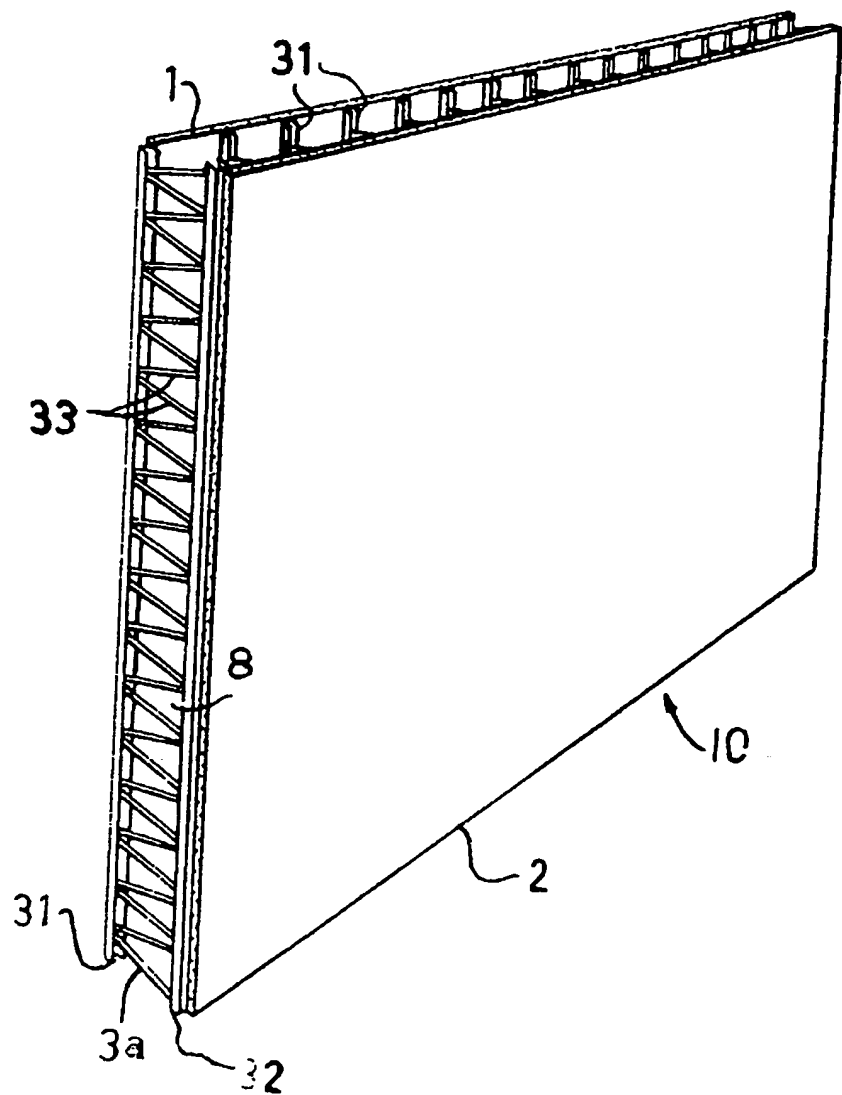
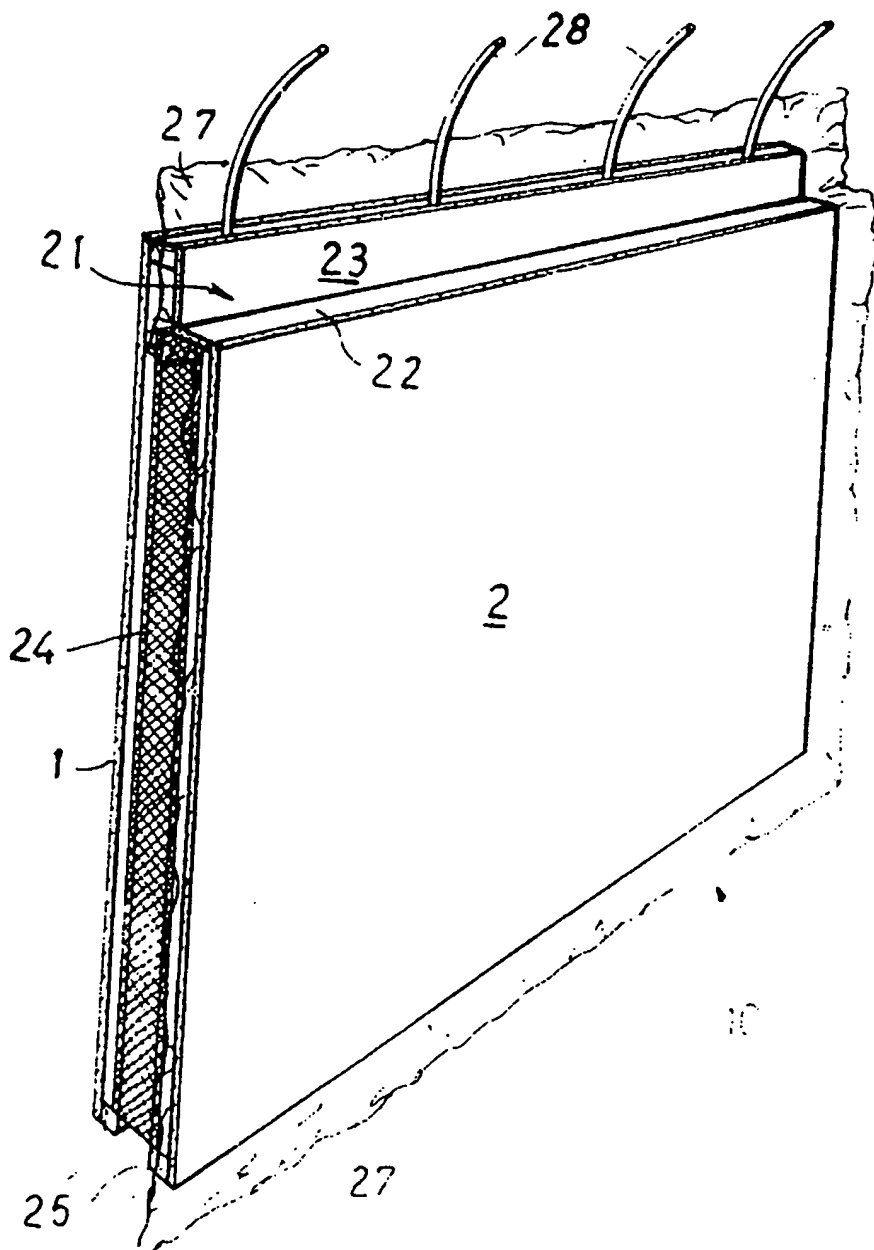


FIG. 7



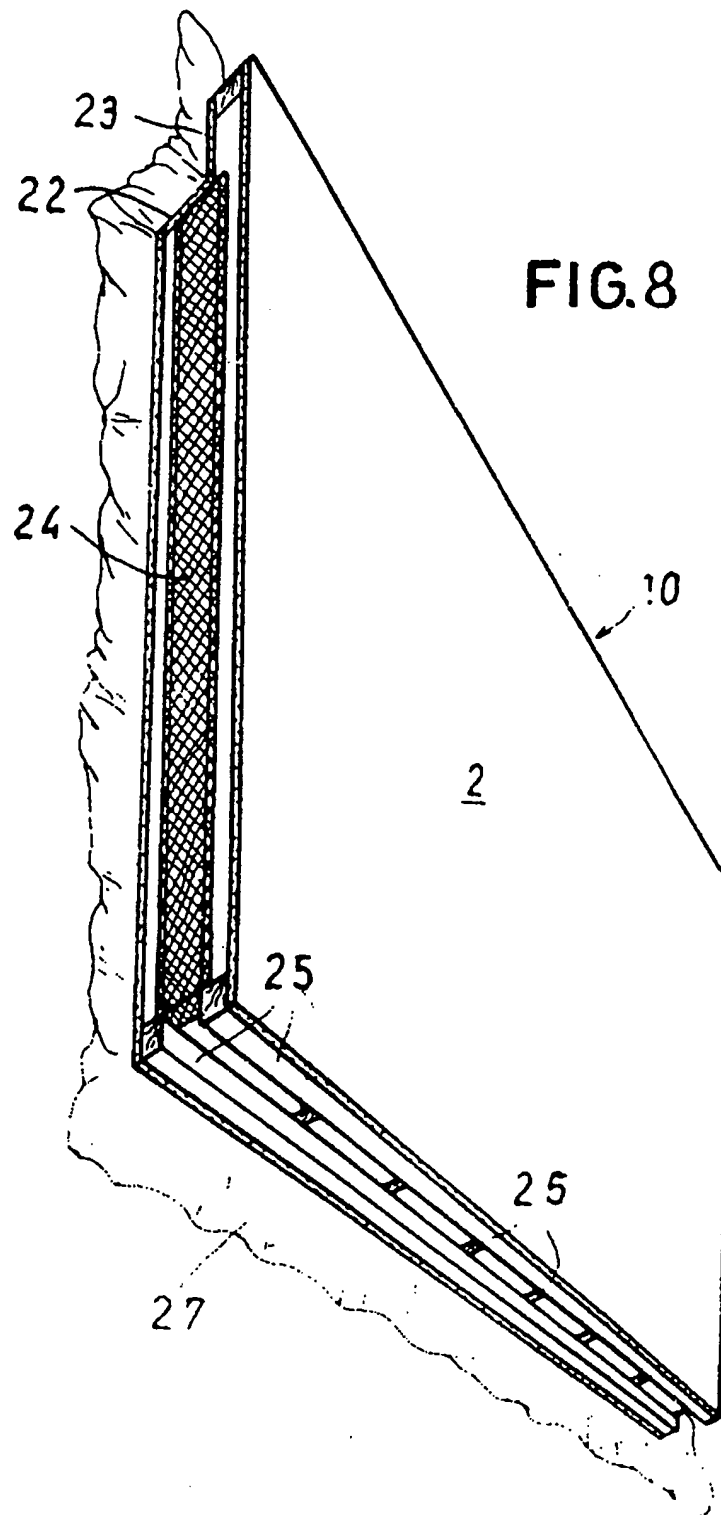
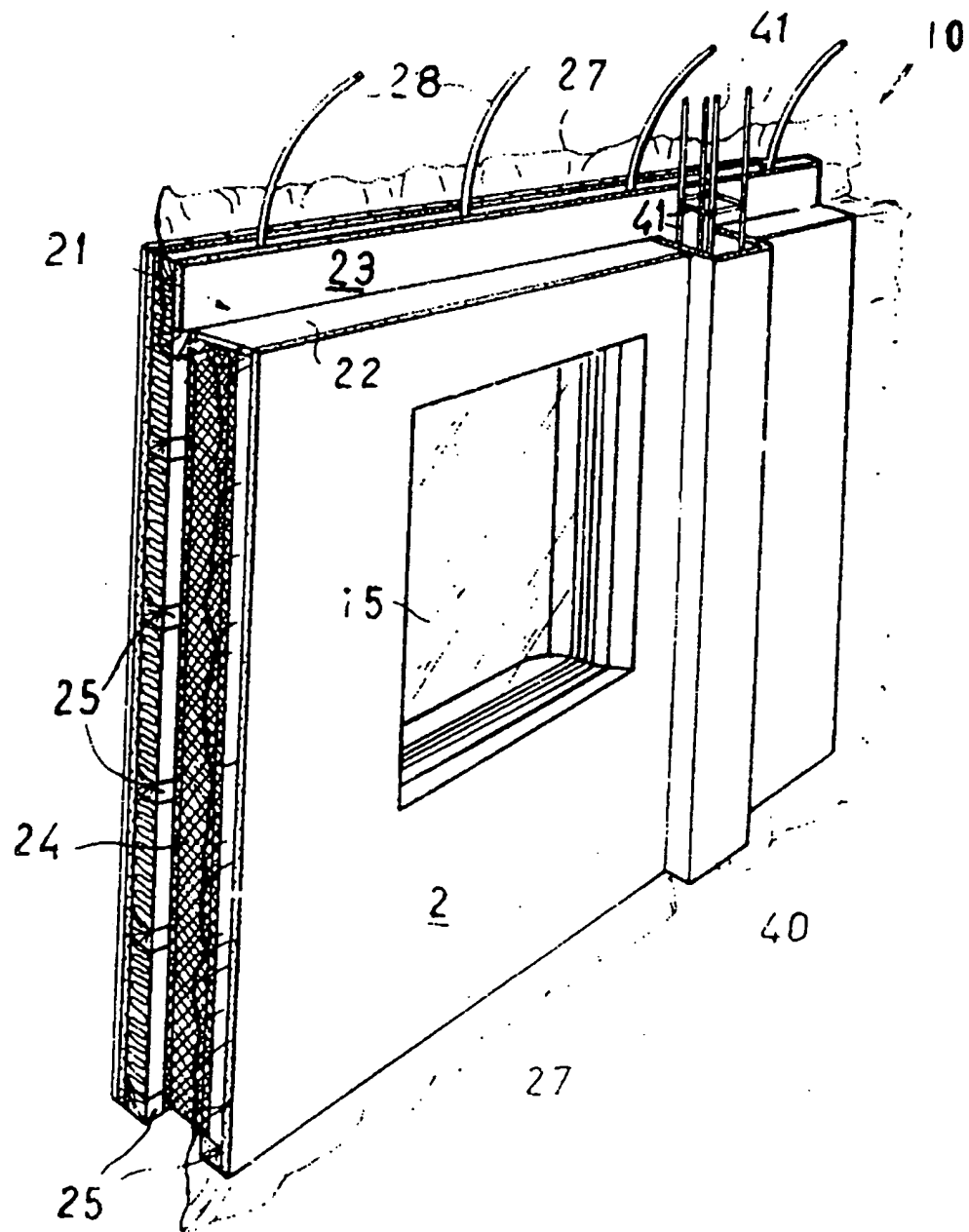
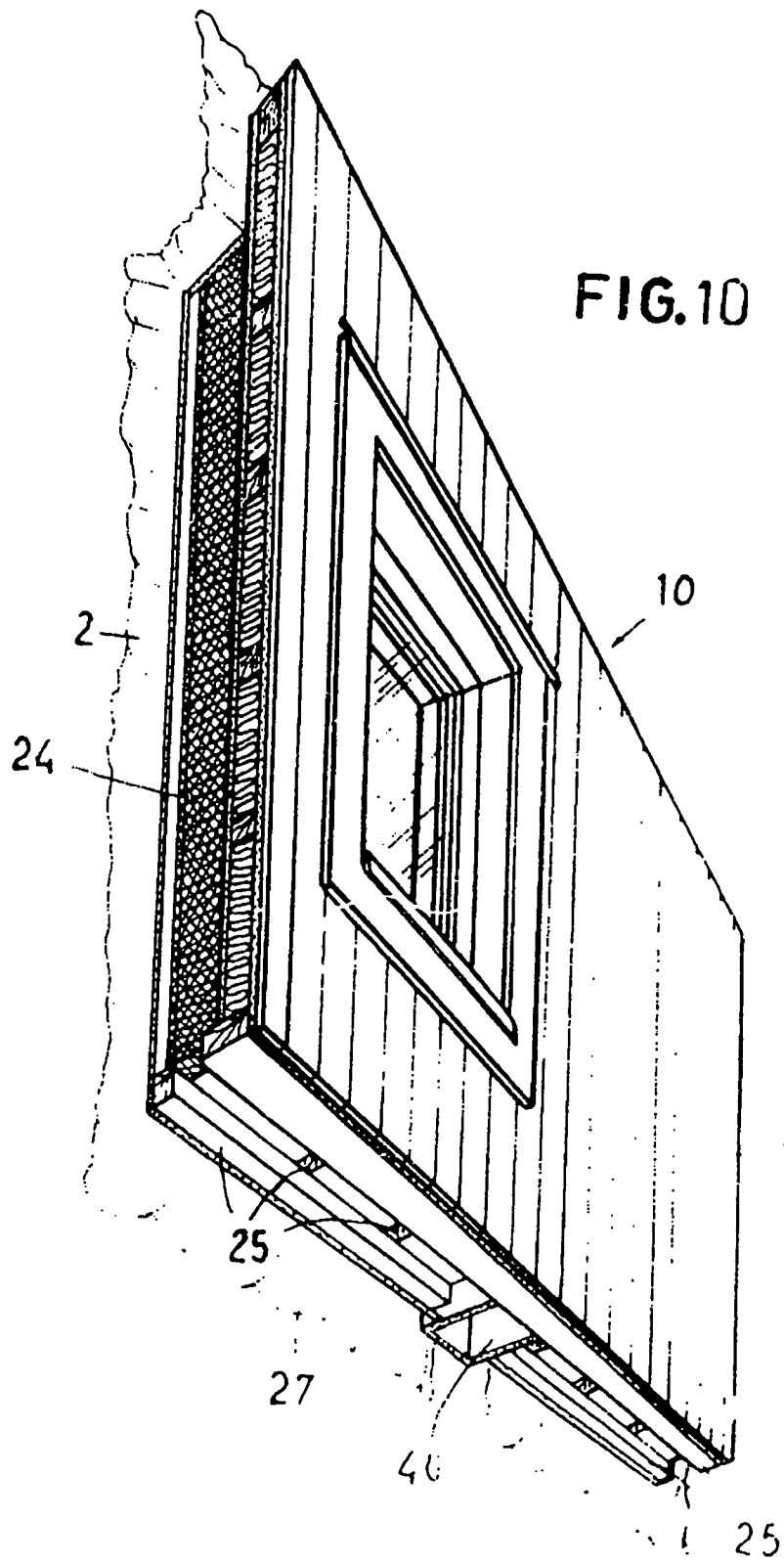


FIG.9





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